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NEW COMBINATIONS AND NOMENCLATURAL NOTES IN THE *SOLANUM UMBELLIFERUM* COMPLEX (SOLANACEAE)

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ABSTRACT

New combinations are made at the varietal level within *Solanum umbelliferum* Eschsch. for *S. xanti* A. Gray, four taxa previously treated as varieties of *S. xanti*, and *S. wallacei* (A. Gray) Parish and its var. *clokeyi* (Munz) McMinn: **Solanum umbelliferum** var. **clokeyi** (Munz) D.J. Keil, **comb. nov.**, **Solanum umbelliferum** var. **hoffmannii** (Munz) D.J. Keil, **comb. nov.**, **Solanum umbelliferum** var. **intermedium** (Parish) D.J. Keil, **comb. nov.**, **Solanum umbelliferum** var. **montanum** (Munz) D.J. Keil, **comb. nov.**, **Solanum umbelliferum** var. **obispoense** (Eastw.) D.J. Keil, **comb. nov.**, **Solanum umbelliferum** var. **wallacei** (A. Gray) D.J. Keil, **comb. nov.**, and **Solanum umbelliferum** var. **xanti** (A. Gray) D.J. Keil, **comb. & stat. nov.** If distinct from *S. umbelliferum* var. *glabrescens* Torr., the plants of northern California to which the name *S. parishii* A. Heller or its homotypic synonym *S. xanti* var. *glabrescens* Parish have been applied apparently lack a validly published name at varietal rank.

Treatments of *Solanum* L. (Solanaceae) in western North American floras (e.g., Jepson 1925; Wiggins 1951, 1980; McMinn 1939; Munz 1959, 1974; Hoover 1970; Nee 1993, 2012) have consistently recognized *S. umbelliferum* Eschsch. and *S. xanti* A. Gray as a pair of closely related species, very similar in floral form and differing in vegetative features, and some (Wiggins 1951; Munz 1959; Nee 1993, 2012) have recognized in addition a third species, *S. parishii* A. Heller. Additionally, floras have included the island endemic *S. wallacei* (A. Gray) Parish, a taxon originally named as a variety of *S. xanti*. Infraspecific variants have been named in *S. umbelliferum*, *S. xanti*, and *S. wallacei*. Variable features within the complex include leaf size, shape, base, and margin, growth habit strictly herbaceous to suffrutescent, and leaf and stem surfaces that vary from glabrous or subglabrous to a dense indumentum of dendritic trichomes and/or various types of simple glandless or gland-tipped trichomes. *Solanum umbelliferum* has been characterized primarily by a more or less dense indumentum of dendritic trichomes that give the herbage a gray-green cast whereas *S. xanti* ranges from glabrous to densely pubescent with glandular and/or gland-tipped trichomes and few, if any, dendritic trichomes and a generally dark green cast to the herbage. *Solanum wallacei* has been distinguished by its large leaves, flowers, and fruits. *Solanum parishii* has been characterized by its glabrous or subglabrous herbage and sessile or proximally tapered leaf blades. Variation patterns within these species are complex, and recognized infraspecific taxa intergrade.

Floras that deal with the whole of California have differed in the number of taxonomically recognized variants within this complex. Wiggins (1951) recognized *Solanum umbelliferum* as comprising two varieties: var. *incanum* Torr. and var. *umbelliferum*; *S. xanti* with six varieties: var. *glabrescens* Parish, var. *hoffmannii* Munz, var. *intermedium* Parish, var. *montanum* Munz, var. *obispoense* (Eastw.) Wiggins, and var. *xanti*; *S. wallacei* with two varieties: var. *clokeyi* (Munz) McMinn and var. *wallacei*; and *S. parishii* without varieties. Munz (1959) recognized *S. umbelliferum* with three varieties: var. *glabrescens* Torr., var. *incanum*, and var. *umbelliferum*; *S. xanti* with four: var. *hoffmannii*, var. *intermedium* (including var. *obispoense* as a synonym), var. *montanum*, and var. *xanti*; *S. wallacei* with two varieties; plus *S. parishii*. Nee (1993, 2012) treated *S. umbelliferum*, *S. xanti*, *S. wallacei*, and *S. parishii* conservatively, placing the formerly recognized

varieties into synonymy while noting the complex patterns of variation and the need for additional study.

In a revision of the "Dulcameroid Clade" of *Solanum*, Knapp (2013) merged *S. umbelliferum*, *S. parishii*, and *S. xanti* as a single species and chose to not recognize any infraspecific variants. She maintained *S. wallacei* as a separate species. Elsewhere in her paper Knapp described her species concept:

> My decisions relied on clear morphological discontinuities to define the easily distinguished species. Specific characters used for recognition are detailed with each species description and in the keys. Potential reasons for variability and intergradation are recent divergence and hybridization. In this revision I have tried to emphasise similarities between populations instead of differences, which so often reflect incomplete collecting or local variation. I have not recognised subspecies or varieties, as I do not feel these are useful categories, either in a taxonomic or evolutionary sense. The variation is better described and documented, rather than formalised with a name which then encumbers the literature. I have been conservative in my approach, recognising as distinct entities those population systems (sets of specimens) that differ in several morphological characteristics. Minor differences in morphology, distribution, habitat, and ecology are important in some groups, where the common ground plan for the species is very similar.

Editors of the Jepson Manual (Baldwin et al 2012) subscribed to a different philosophy in dealing with infraspecific variation. This was summarized in the contributors guide to the Jepson Manual (Baldwin et al. 2004):

> Taxonomic concepts of equal scientific validity may differ with respect to rank (e.g., whether to recognize a particular group as a species, subspecies, or variety) or circumscription (e.g., whether to recognize one widely delimited species or to treat the same set of plants within multiple, more narrowly delimited species). Taxonomic concepts of equal validity may even differ regarding the position of a plant group (e.g., which genus a particular species belongs in), insofar as circumscriptions of higher-level taxa may differ. Such legitimate differences in taxonomic practice should not be misconstrued as a lack of rigor in systematics and do not take away from the fundamental reality of plant groups as evolutionary entities. A common feature of all taxonomic concepts recognized by The Jepson Flora Project and the modern systematic community in general is that the taxa being recognized should represent natural, evolutionary lineages. Also, because TJM2 will be used (like TJM) as a definitive resource for assessing plant diversity in California (e.g., for conservation planning by state and federal agencies), we seek to capture within it all biologically meaningful, minimal-rank taxa (e.g., species, subspecies, and varieties) recognized to occur in the California flora.

Differences between Knapp's taxonomic philosophy and the Jepson Manual approach hinge on whether patterns of infraspecific variation are evolutionarily or biologically meaningful. Knapp: "I do not feel these are useful categories, either in a taxonomic or evolutionary sense." Baldwin et al.: "we seek to capture within it all biologically meaningful, minimal-rank taxa (e.g., species, subspecies, and varieties) recognized to occur in the California flora."

In preparation of the second edition of the Vascular Plants of San Luis Obispo County, California (Keil & Hoover in prep.), I am faced with how to deal with the variation in this group of nightshades. I agree with Dr. Knapp that they are best treated as a single variable species. However, members of this complex with differing morphologies occupy different habitats within the San Luis Obispo County and California as a whole. Plants with the traditional concept of *Solanum umbelliferum* (sensu stricto) are largely allopatric from those with *S. xanti* form. Both show considerable variation. In his San Luis Obispo County flora Hoover (1970) recognized two varieties of *S. umbelliferum* and three of *S. xanti* while recognizing that "the [latter] species is highly variable, and varieties can be distinguished only rather arbitrarily." However, he noted that "in view of the

apparent close relationship between *S. umbelliferum* var. *incanum* and *S. xanti* var. *obispoense*, the absence of hybrids is notable." In my opinion merging all the variants under a single species name without recognition of infraspecific variants masks important patterns of ecogeographical variation, at least some of which may be evolutionarily important. Focused research that is far beyond the scope of my floristic studies is needed to shed light on these patterns. The *S. umbelliferum* complex is much in need of a detailed investigation using modern tools. In the meantime, California taxonomists need the nomenclatural flexibility to deal with the range of variation among these plants.

Names already exist at the varietal level for variants recognized in the past in *Solanum umbelliferum* (sensu stricto). However, *S. xanti* and most of the variants that were taxonomically recognized by Abrams (1951) and Munz (1959) in *S. xanti* have no names at the varietal level within *S. umbelliferum* (sensu lato). I am here making the new combinations needed to treat five of these taxa as varieties of *S. umbelliferum*, thereby making these combinations available to taxonomists who wish to recognize infraspecific taxa in the *S. umbelliferum* complex. Following discussions with Dr. Knapp I am also treating *S. wallacei* and *S. wallacei* var. *clokeyi* as varieties of *S. umbelliferum.*

SOLANUM UMBELLIFERUM Eschsch. var. **CLOKEYI** (Munz) D.J. Keil, **comb. nov.** *Solanum arborescens* Clokey, Bull. S. Calif. Acad. Sci. 30: 60. 1931, non Moench, 1794. *Solanum clokeyi* Munz Bull. S. Calif. Acad. Sci. 31: 69. 1932. *Solanum wallacei* (A. Gray) Parish var. *clokeyi* (Munz) McMinn, Man. Calif. Shrubs 491. 1939. **LECTOTYPE** (Knapp 2013): **USA.** Santa Barbara Co.: Santa Cruz Island, Pelican Bay, 23 May 1930, *I.W. Clokey 5047* (UC, image!).

SOLANUM UMBELLIFERUM Eschsch. var. **HOFFMANNII** (Munz) D.J. Keil, **comb. nov.** *Solanum xanti* A. Gray var. *hoffmannii* Munz, Bull. S. Calif. Acad. Sci. 31: 70. 1932. **TYPE**: **USA. California.** Santa Barbara Co.: Gaviota Pass, 26 Mar 1925, *P. Munz 9315* (holotype: POM-98450 [image requested]).

SOLANUM UMBELLIFERUM Eschsch. var. **INTERMEDIUM** (Parish) D.J. Keil, **comb. nov.** *Solanum xanti* A. Gray var. *intermedium* Parish, Proc. Calif. Acad. Sci. ser. 3, Bot. 2: 168. 1901. **LECTOTYPE** (Knapp 2013): **USA. California.** San Bernardino Co.: Vicinity of San Bernardino, 12 May 1897, *S.B. Parish 4388* (JEPS-12142 [image requested]).

SOLANUM UMBELLIFERUM Eschsch. var. **MONTANUM** (Munz) D.J. Keil, **comb. nov.** *Solanum xanti* A. Gray var. *montanum* Munz, Bull. S. Calif. Acad. Sci. 31: 70. 1932. **TYPE**: **USA. California.** San Bernardino Co.: North end of Bear Valley, San Bernardino Mountains, 6000–8500 ft., 26 Mar 1925, *P. Munz 5718* (holotype: POM-13481 [image requested]).

SOLANUM UMBELLIFERUM Eschsch. var. **OBISPOENSE** (Eastw.) D.J. Keil, **comb. nov.** *Solanum obispoense* Eastw., Leafl. West. Bot. 1: 104. 1934. *Solanum xanti* A. Gray var. *obispoense* (Eastw.) Wiggins in L. Abrams, Illustr. Fl. Pacific States 3: 680. 1951. **LECTOTYPE** (Knapp 2013): **USA. California.** San Luis Obispo Co.: Santa Margarita, El Dorado School, 20 Apr 1933, *M.E. Wall s.n.* (CAS-204657, image!).

SOLANUM UMBELLIFERUM Eschsch. var. **WALLACEI** (A. Gray) D.J. Keil, **comb. & stat. nov.** *Solanum xanti* A. Gray var. *wallacei* A. Gray, Proc. Amer. Acad. Arts 11: 91. 1876. *Solanum wallacei* (A. Gray) Parish, Proc. Calif. Acad. Sci. ser. 3, Bot. 2: 166. 1901. **TYPE**: **USA. California.** Los Angeles Co.: Santa Catalina Island, undated, *W.A. Wallace s.n.* (holotype: GH [GH00077433, image!]).

SOLANUM UMBELLIFERUM Eschsch. var. **XANTI** (A. Gray) D.J. Keil, comb. & stat. nov. *Solanum xanti* A. Gray, Proc. Amer. Acad. Arts 11: 90. 1876. **LECTOTYPE** (Parish 1901): **USA. California.** Kern Co.: Fort Tejon and vicinity, near lat. 35°and long. 119°, 1857–1858, *L.J. Xantus de Vesey 73* (GH-00077430 [image requested]).

The sixth variety of *Solanum xanti* recognized by Wiggins, *S. xanti* var. *glabrescens* Parish, cannot be directly transferred to *S. umbelliferum* because the combination *S. umbelliferum* var. *glabrescens* Torr. already exists. Heller (1906) raised *S. xanti* var. *glabrescens* Parish to the species rank as *S. parishii* A. Heller. However, it is doubtful that the types of the two glabrescent varieties actually represent different entities; they strongly resemble each other and both were collected from the San Bernardino area in San Bernardino County, California. Heller (1906) considered it likely that the plants to which he applied the name *S. parishii* were the same as *S. umbelliferum* var. *glabrescens* Torr. If this is so, the heterotypic combination *S. umbelliferum* var. *glabrescens* Torr. is already available for use for the plants treated as *S. xanti* var. *glabrescens* Parish. Nee (1993, 2012) recognized *S. parishii* as a widely distributed species ranging from southern Oregon to northern Baja California. However, Wiggins (1951) and Munz (1959) considered the northern California plants to which they applied the name *S. parishii* to be a species separate from *S. umbelliferum* and *S. xanti*. I agree with Knapp (2013) that Heller (1906) proposed *S. parishii* as a replacement name for Parish's *S. xanti* var. *glabrescens*, and did not describe it as a new taxon. It is quite possible that the northern California plants do represent a separately derived lineage of glabrescent plants that might warrant taxonomic recognition at the varietal level, but this lineage, *S. parishii* (sensu Wiggins and Munz), lacks a validly published varietal epithet. However, I am not proposing a varietal name within *S. umbelliferum* for these plants.

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